

Disruptive Commercial Technologies

*008 Naval Research Advisory Committee
Study*

“...Irregular warfare and all aspects of it will be with us...for the next couple of decades...so we need to invest in that and we need to make sure we get that right”

—Admiral Michael Mullen

Chairman, JCS

12 June 2008

National Press Club

- *TOR & Fact Finding*
- *Bottom Line Up Front*
- *The Landscape*
- *Red Cell Experiment*
- *Findings*
- *Recommendations*
- *Actions*

Terms of Reference

- *Problem: Threats to Marine Corps Expeditionary Forces include globally available commercial products that may be “weaponized”*
- *Tasking:*
 - *Study potentially disruptive nature of current/near future technologies*
 - *Identify technologies and products that pose immediate asymmetrical counter to Marine Forces*
 - *Establish threats & timelines*
 - *Identify indicators to aid in recognizing deployed DCTs*
 - *Propose countermeasures*
 - *Propose investment strategy to counter DCTs*
 - *Focus study on 3 - 7 years*

Fact-Finding

Marine Corps/Navy

- CG, MCCDC (Study Sponsor)
- Strategic Vision Group
- Marine Corps Intelligence Activity
- Capabilities Development Division, MCCDC
- Center for Emerging Threats and Opportunities
- Office of the Vice Chief of Naval Research
- ONR Code 30
- ONR Global

Defense University/National Lab

- National Defense University
- Naval Postgraduate School
- Sandia National Laboratories

Other DOD and Agencies

- ODDR&E
- Senior Office of Director of National Intelligence alumnus
- Defense Intelligence Agency, Defense Warning Office
- Senior DARPA alumni
- Central Intelligence Agency
- CIA, Weapons, Intelligence, Nonproliferation, and Arms Control Center (WINPAC)

Others

- National Research Council Study Panel (DIA-sponsored)
- CISCO
- In-Q-Tel
- Synthesis Partners, Inc.
- Opportunity International
- Global Fairness Initiative
- Strategic News Service



Observations and Guidance

- *Many efforts identify lists of potential disruptive threats*
 - *Capabilities Surprise (DSB Summer Study) 2008 (underway)*
 - *Future Warfare Technologies (CIA) 2008*
 - *Ahead of the Curve (Monitor Group) 2007*
 - *Global Strategic Trends Programme (DCDC) 2006*
 - *Avoiding Surprise in an Era of Global Technology Advances (NRC/National Academies) 2005*
 - *Global Technology Revolution (RAND) 2001*
 - *Technology Acquisition by Terrorist Groups (RAND) 2001*
- *Sponsor follow-on guidance*
 - *Real contribution—recommendations for a process to anticipate, identify, and counter commercial technologies disruptive to Marine Corps tactical operations*
- *The Study will recommend how the Marine Corps can prepare for commercial technology threats*



What we learned early

- *It's about anything that attacks key capabilities or gaps*
 - *It's not limited to "disruptive technologies"*
- *It's about the power of unconventional and unconstrained imagination*
 - *It's not about "technology surprise"*
- *It's about anticipating threats*
 - *It's not about merely reacting*
- *It's about operating in a much wider orbit outside the domain of intelligence*
 - *It's not about functioning within it*
- *It's about how they see the world and process information*
 - *It's not about how we do*

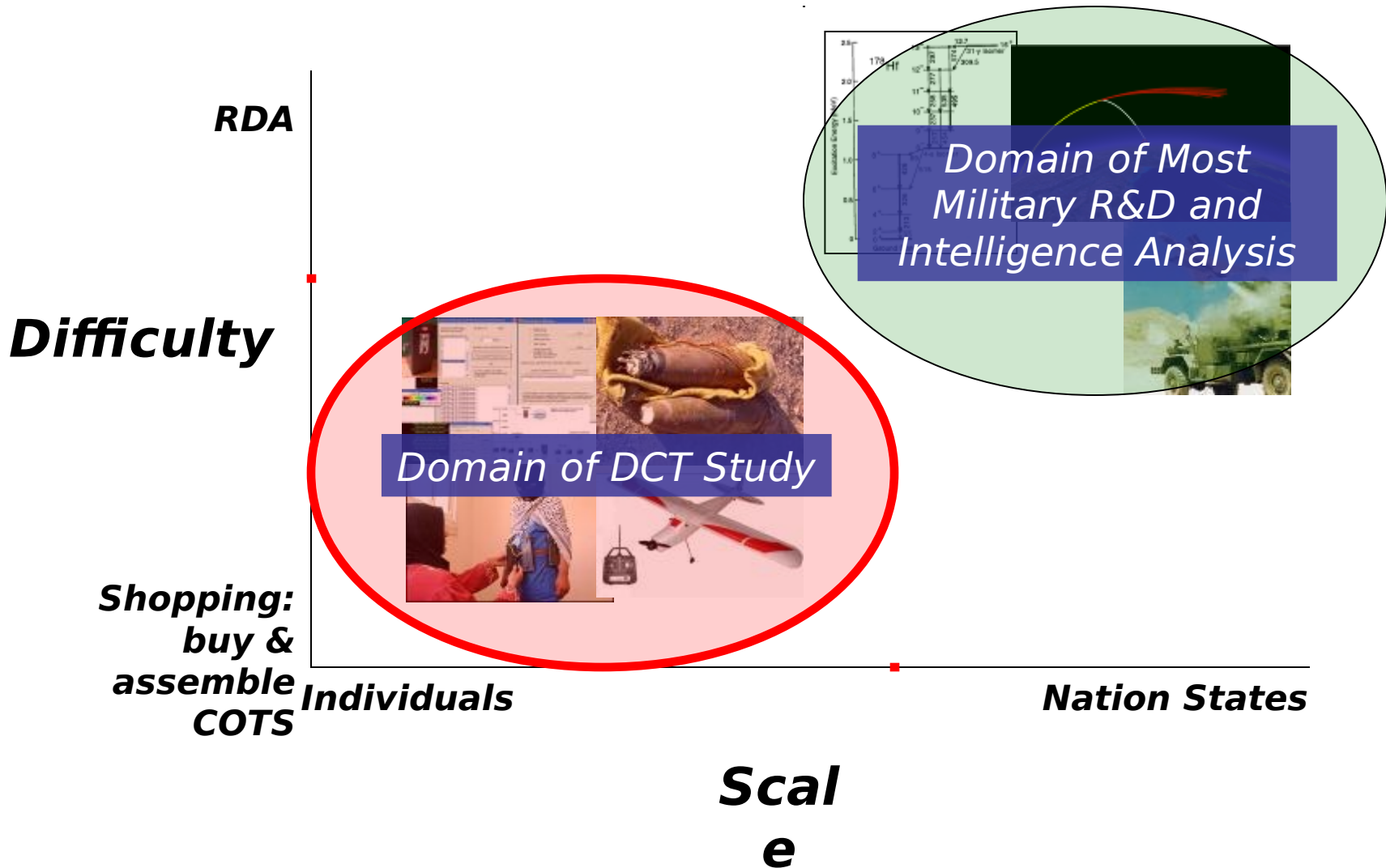


Bottom Line Up Front

- *Another list created by an advisory committee is not the solution*
- *Small groups easily connecting to the web will increasingly disrupt Marine Corps operations*
- *USMC has no means of proactively anticipating unconventional commercial threats and responding*
- *Key actions*
 - *Bring in creative unconventional outsiders to anticipate new threats . . . a “Commercial Hunter”*
 - *Accelerate ability to neutralize and defeat threats*
 - *Educate and train against commercial technology threats*



Marine forces face diverse threats



The Landscape: Diverse Threats

- *Conventional adversaries (not this Study's focus)*
 - Nation states with conventional forces
 - Characterized by significant resources applied over extended periods (long cycle times)
 - Mostly observable and understood, thus reasonably predictable
- *Irregular adversaries (**this Study's focus**)*
 - Generally stateless, yet transnational
 - Characterized by adequate resources applied to immediate tasks (extremely short cycle times)
 - Difficult to observe, penetrate, and predict

The Landscape: The Irregular Adversary

- *Young, intelligent, culturally savvy, and flexible*
- *Naturally comfortable with today's technology tools*
- *Nonlinear thinking and uninhibited methods—not rule-bound*

NRAC **Landscape: The Technological Element**

Globalized information & supply

- *Web enables anyone to:*
 - *Recruit and train*
 - *Research and collaborate*
 - *Procure*
 - *Attack*
 - *Remain anonymous*
- *Cell phone provides basic C4ISR*
 - *87% of the world's population is covered with a cellular phone network*
 - *>3 billion cell phones in use globally*
 - *VSAT (Very Small Aperture Terminal) available globally*





If we only see the problem through our eyes...we lose

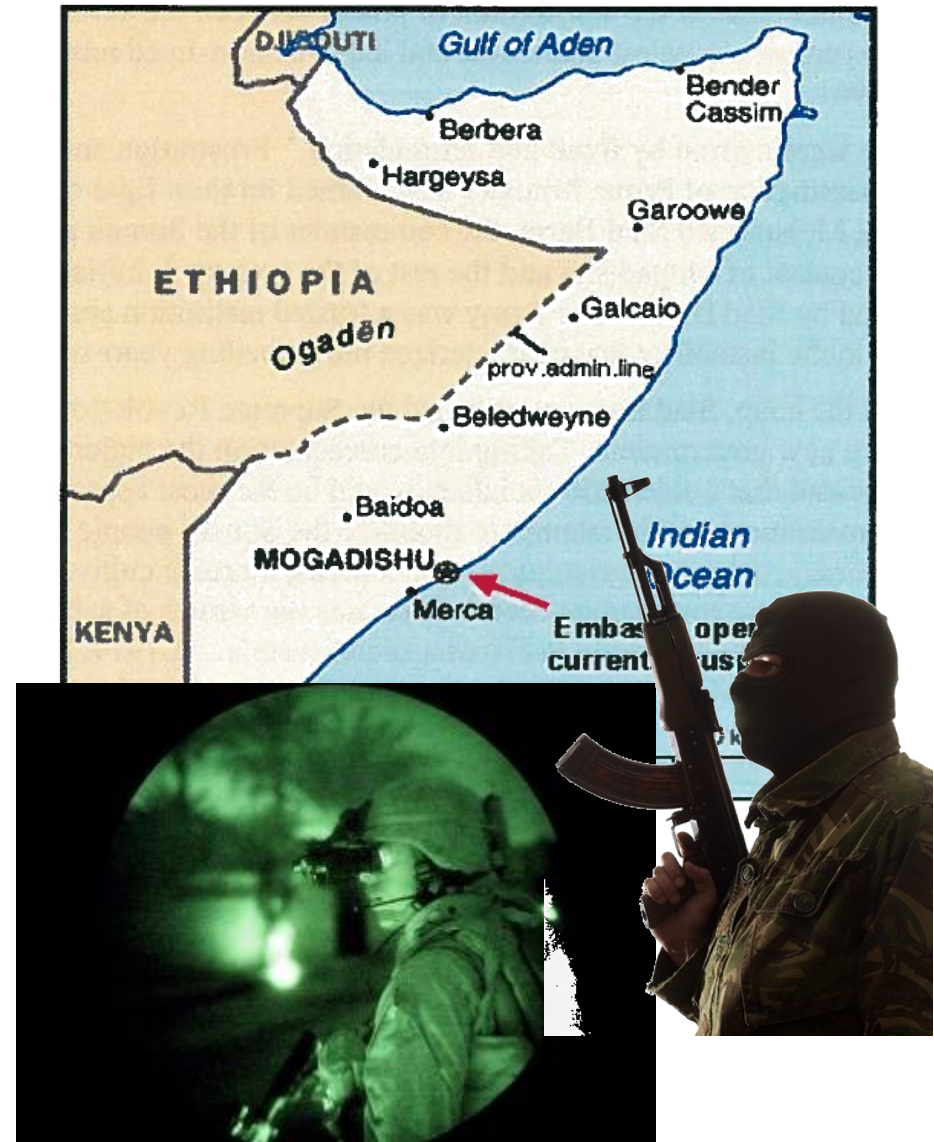
- *Experiment: Can creative people having internet access develop concepts to threaten key USMC capabilities?*
- *Approach:*
 - *Recruit tech-savvy creative people w/o military expertise*
 - *Use Expeditionary Warfare School Tactical Decision Game*
 - *Specify USMC targeted capabilities*
 - *Shop for off-the-shelf products via the Internet*
- *Process:*
 - *NRAC panel member recruited, created experiment format and ran session*

- *Players drawn from two groups in entertainment industry:*
 - *New media content creators*
 - *New media technology enablers*
 - *Groups shuffled into two teams*
- *Observer/Controller SMEs*
 - *Director of DIA Defense Warning Office, Red-Team specialist*
 - *USMC CH-46 pilot, recent NPS graduate*
 - *University physics professor*
- *One session, nominally four hours*
 - *Red cell researched targeted USMC capabilities*
 - *Concept development concurrent with “shopping”*
 - *Web sites visited documented*



NRAC Scenario

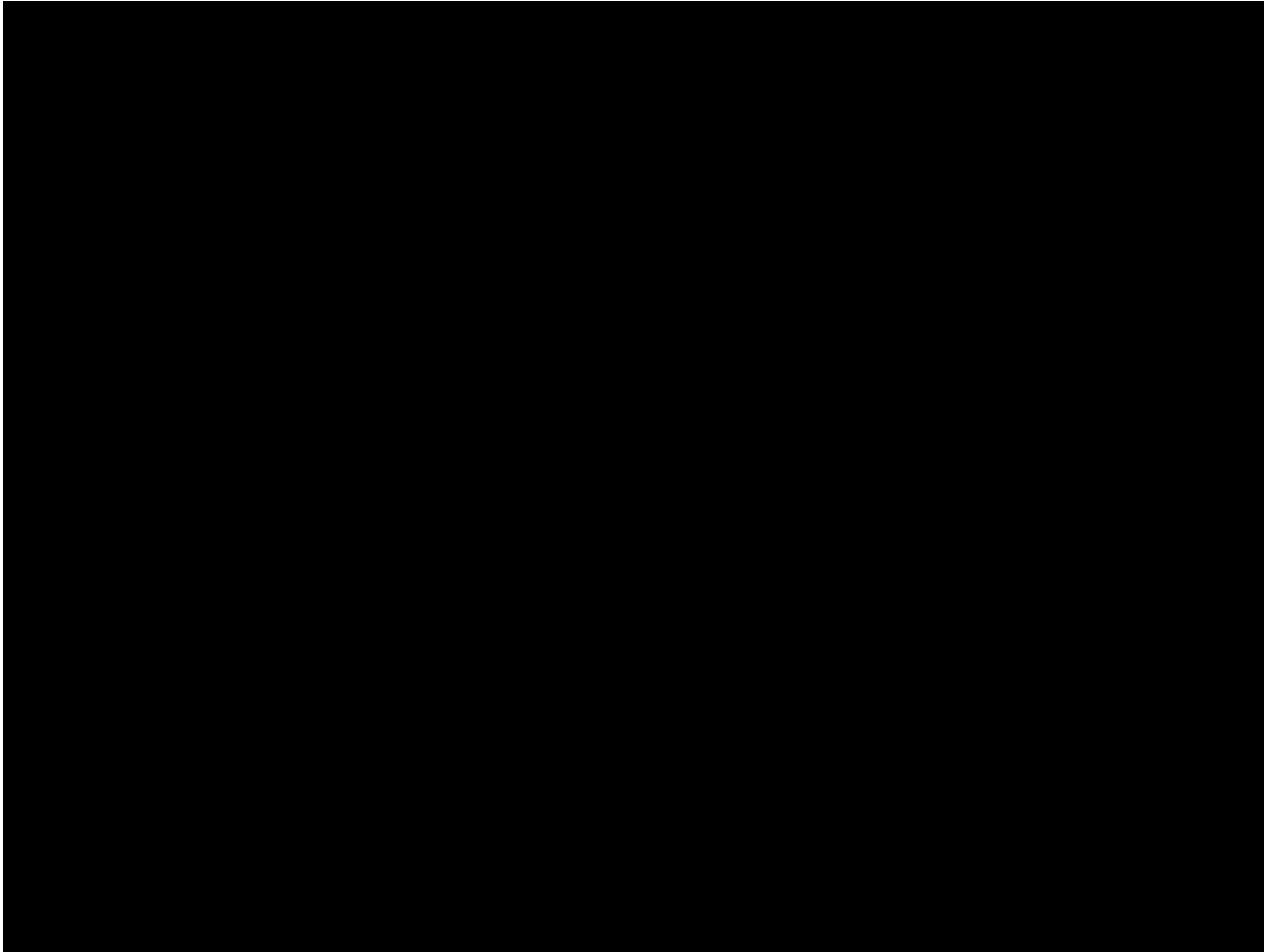
- Marine Expeditionary Unit (MEU) supporting a UN Peace-keeping force in Somalia
- USMC drives insurgent force into complex terrain
- Insurgents sustain heavy losses--Marines' success keyed to ability to conduct night and helicopter operations
- Italy-based red cell tasked with
 - Creating countermeasures
 - Establishing comparable night capabilities
- Unlimited funding; all material from Internet



NRAC **Results:** **Helicopter** **Countermeasures**

- *Unmanned Aerial Vehicles (UAVs) can serve as loitering aerial mines & sensors*
- *UAVs can disperse sensors to detect helicopters*





NRAC Results: **Cheap C4ISR**

- *Deploy wireless COTS sensors:*
 - Network security cameras (EO/IR)
 - Motion sensors
 - Acoustic sensors
 - Seismic sensors
 - New iPhone
 - Human-in-the-loop (HITL) sensor f

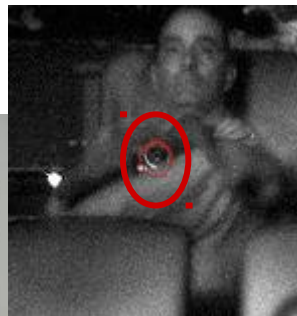
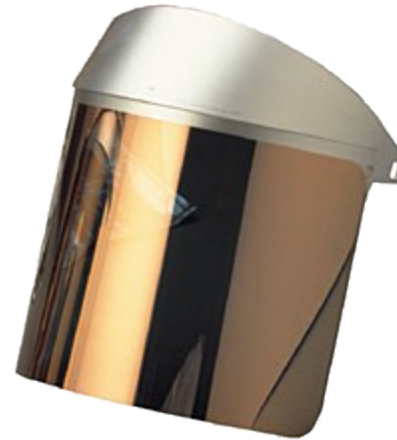
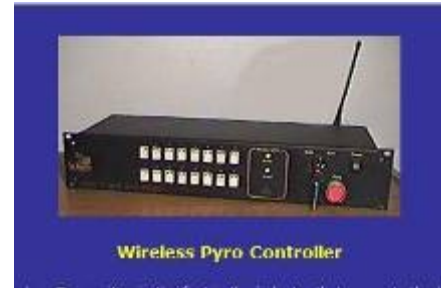


Home: Sensors & Measurement: Seismic Sensors & Measurement:

- [Acceleration Sensors & Measurement](#) (63)
- [Acceleration Switches](#) (4)
- [Lab Equipment](#) (24)
- [Shock & Vibration Software](#) (2)
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- Active/passive
 - Magnesium firebreak
 - Smoke bombs
 - 2M candlepower IR illuminators aimed at disco balls
 - IR strobes to spoof Blue Forces
- Polycarbonate police shields that block IR info
- PirateEye modified to work with an IR laser



We specialize in small orders"
Chemicals & Metals

Implications of Experiment

- *Creative people + target + web + global supply = credible threat*
- *Threats developed at two levels—each has value in anticipation:*
 - *Conceptual (airborne loitering minefields)*
 - *Material (specific applications of products)*
- *Two independent groups produced similar results, and looked at many of the same web sites*
 - *Convergence worth looking for, therefore...*
 - *Need multiple groups producing concepts*
- *Both groups heavily influenced by same-day announcement of new iPhone*
 - *Different result if exercise were a day earlier, therefore...*
 - *Need continuing process*

Commercial Hunter **. . . the rationale**

- *Combat Hunter used professional big-game hunters, trackers, and cops on the beat to modify tactics against irregular forces*
- *“Commercial Hunter” would use outside experts to anticipate, identify, and defeat commercial technology threats*



Commercial Hunter Cell **. . . the idea**

- *Anticipate threats via opposing force exercises using teams of smart, young, web-savvy people, from diverse backgrounds*
- *Identify and prioritize threats*
- *Buy from internet; integrate prototype to prove technical feasibility*
- *Provoke action*

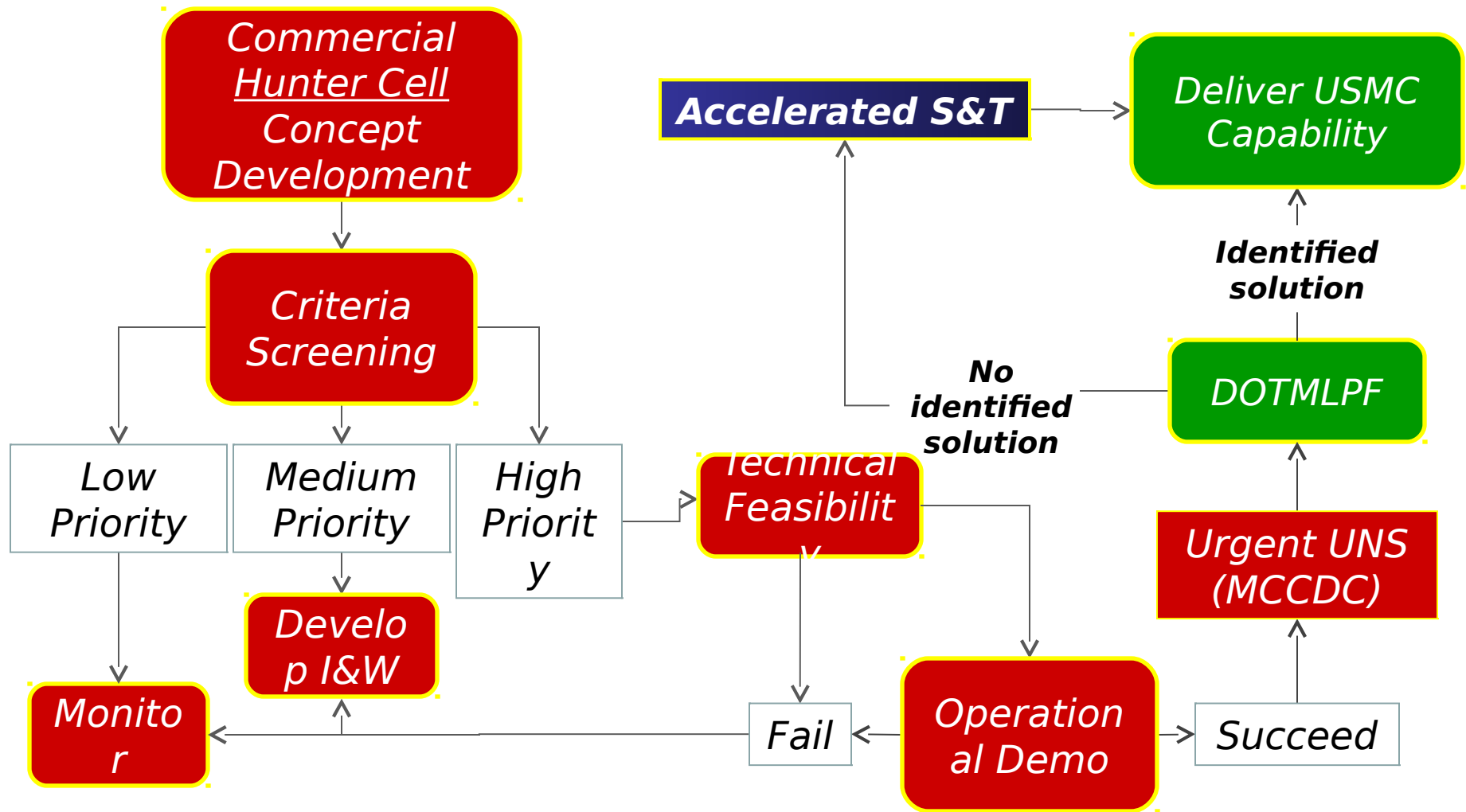


Commercial Hunter Cell ... Characteristics

- **People**
 - *Small standing core group with creative leadership, admin, engineers & technicians from several disciplines*
 - *Teams of creative outsiders who come and go on timelines consistent with the nature of the task*
- **Facilities:**
 - *Minimal facility with rapid prototyping capability, equipment where needed, located off base*
- **Time & money:**
 - *Ability to go from idea to demo in days or weeks not months or years*
 - *Budget, contracting, and purchasing authority*



Commercial Hunter Cell ... a model





Urgent UNS Response Gap?

- *In support of urgent needs with identifiable solutions, DoN has processes for*
 - ***rapid acquisition*** of known products
 - ***rapid prototyping*** of developmental systems \geq TRL 6
- *However, for challenges with no immediately identifiable remedy, or solution $<$ TRL 6*
 - *the panel could not find an accelerated S&T process*



Implications: Training & Education

- *An introduction & reminder at all levels of formal education for this new challenge*
 - *Commercial technology threat is real, already exists, and will grow*
- *Need to instruct Marines what to look for during all phases of operation (I&W)*
- *Need to realistically equip unconventional OPFOR as seriously as we do conventional OPFOR*
- *Need to introduce these types of challenges to our capabilities at all levels of wargames (EWS, C&S)*
- *Commercial Hunter Cell's additional duty is to support all of the above*

- *Credible threats to Marine capabilities...*
 - *Can be developed from imaginative combinations of commercial products*
 - *Can be acquired via the Web and distributed by the global supply network*
- *The Marine Corps has no effective methods for anticipating these unconventional threats*
 - *Nor access to a proactive and rapid system for threats without identifiable solutions*

Recommendations

- *Create an accelerated S&T approach to address potential solutions below TRL 6 for Urgent Universal Needs Statement (UUNS) requirements*
- *Authorize CG, MCCDC, to create UUNS*
- *Establish Commercial Hunter*

- **ASN (RDA)**
 - *Direct CNR to develop an accelerated S&T approach for UUNS that have no mature solution to achieve prototypes*
- **CMC**
 - *Authorize CG, MCCDC, to create Urgent UNS*
- **CG, MCCDC**
 - *Establish Commercial Hunter*
 - *Incorporate training and education for commercial threats*

DCT Panel Membership

Study Panel Members

- **BGen James M. Feigley, USMC (Ret.) - Chair**
 - NRAC Associate
- **Dr. A. Michael Andrews, II - Co-Chair**
 - L-3 Communications
- **Dr. Regina E. Dugan**
 - RedXDefense
- **MajGen Paul Fratarangelo, USMC (Ret.)**
 - NRAC Consultant
- **Mr. Gilbert V. Herrera**
 - Sandia National Laboratories
- **Mr. James H. Korris**
 - Creative Technologies Inc.
- **MajGen Leo V. Williams, USMCR (Ret.)**
 - Medifast, Inc
- **Professor Walt Williamson**
 - Texas Christian University
- **Professor Patrick H. Winston**
 - Massachusetts Institute of Technology
- **Dr. Helena S. Wisniewski**
 - Stevens Institute of Technology
- **Mr. James L. Wolbarsht**
 - DEFCON® Inc.

Study Sponsor

- **LtGen James F. Amos, USMC**
 - Panel Sponsor
 - CG, MCCDC
 - DC CDI

Executive Secretariat

- **Mr. Robert McKinney - Executive Secretary**
 - MCWL (OSTI)
- **Mr. B. Greg Kesselring - Asst. Executive Sec.**
 - MCWL (OSTI)
- **Mr. E. William Powers - Asst. Executive Sec.**
 - MCWL (CETO)

In memoriam

- **Mr. Jack Bachkosky**
 - Study panel member, long-serving NRAC member

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